

Personal digital assistant

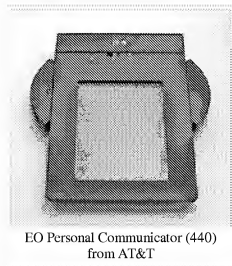
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A **personal digital assistant (PDA)**, also known as a **palmtop computer**, is a mobile device which functions as a Personal information manager and connects to the internet. The PDA has an electronic visual display enabling it to include a web browser, but some newer models also have audio capabilities, enabling them to be used as mobile phones or portable media players. Many PDAs can access the internet, intranets or extranets via Wi-Fi, or Wireless Wide Area Networks (WWANs). Many PDAs employ touchscreen technology.

The term PDA was first used on January 7, 1992, by Apple Computer CEO John Sculley at the Consumer Electronics Show in Las Vegas, Nevada, referring to the Apple Newton. In 1996, Nokia introduced the first mobile phone with full PDA functionality, the 9000 Communicator, which has since grown to become the world's best-selling PDA and which spawned a category of phones called the smartphone. Today the vast majority of all PDAs are smartphones, selling over 150 million units while non-phone ("stand-alone") PDAs sell only about 3 million units per year. The RIM BlackBerry, the Apple iPhone and the Nokia N-Series and HTC are typical smartphones.



The Palm TX



EO Personal Communicator (440)
from AT&T

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Typical features

Currently, a typical PDA has touch screen for entering data, a memory card slot for data storage and at least one of the following for connectivity: IrDA, Bluetooth and/or WiFi. However, many PDAs (typically those used primarily as telephones) may not have a touch screen, using softkeys, a directional pad and either the numeric keypad or a thumb keyboard for input.

Software typically required to be a PDA includes an appointment calendar, a to-do list, an address book for contacts and some sort of note program. Connected PDAs also typically include E-mail and Web support.

Touch screen

Many of the original PDAs, such as the Apple Newton and Palm Pilot, featured touchscreen for user interaction, having only a few buttons usually reserved for shortcuts to often used programs. Touch screen PDAs, including Windows Mobile devices, usually have a detachable stylus that can be used on the touch screen. Interaction is then done by tapping the screen to activate buttons or menu choices, and dragging the stylus to, for example, highlight. Text input is usually done in one of four ways:

- Using a virtual keyboard, where a keyboard is shown on the touch screen. Input is done by tapping letters on the screen.
- Using external keyboard or chorded keyboard connected by USB, IR or Bluetooth.
- Using letter or word recognition, where letters or words are written on the touch screen, and then "translated" to letters in the currently activated text field. Despite rigorous research and development projects, end-users experience mixed results with this input method, with some finding it frustrating and inaccurate, while others are satisfied with the quality.^[1] Recognition and computation of handwritten horizontal and vertical formulas such as " $1 + 2 =$ " was also under development.
- Stroke recognition (one Palm implementation is called Graffiti). In this system a predefined set of strokes represents the various characters used in input. The user learns to draw these strokes on the screen or in an input area. The strokes are often simplified character shapes to make them easier for the device to recognize.

PDAs for business use, including the BlackBerry and Palm Treo, have full keyboards and scroll wheels or thumb wheels to facilitate data entry and navigation, in addition to supporting touch-screen input. There are also full-size foldable keyboards available that plug directly, or use wireless technology to interface with the PDA and allow for normal typing. BlackBerry has additional functionality, such as push-based email and applications.

Newer PDAs, such as the Apple iPhone, iPod Touch and Palm Pre include new user interfaces using other means of input. The iPhone and iPod touch uses a technology called Multi-touch, as does the Palm Pre and HTC HD2.

Memory cards

Although many early PDAs did not have memory card slots now most have either an SD (Secure Digital) and/or a Compact Flash slot. Although originally designed for memory, SDIO and Compact Flash cards are available for such things as Wi-Fi and Webcams. Some PDAs also have a USB port, mainly for USB flash drives. Some PDAs are now compatible with micro SD cards, which are physically much smaller than standard SD cards.

Wired connectivity

While many earlier PDAs connected via serial ports or other proprietary format, many today connect via USB

cable. This served primarily to connect to a computer, and few, if any PDAs were able to connect to *each other* out of the box using cables, as USB requires one machine to act as a host - functionality which was not often planned. Some PDAs were able to connect to the internet, either by means of one of these cables, or by using an extension card with an ethernet port/RJ-45 adaptor.

Wireless connectivity

Most modern PDAs have Bluetooth wireless connectivity, an increasingly popular tool for mobile devices. It can be used to connect keyboards, headsets, GPS and many other accessories, as well as sending files between PDAs. Many mid-range and superior PDAs have Wi-Fi/WLAN/802.11-connectivity, used for connecting to Wi-Fi hotspots or wireless networks. Older PDAs predominantly have an IrDA (infrared) port; however fewer current models have the technology, as it is slowly being phased out due to support for Bluetooth and Wi-Fi. IrDA allows communication between two PDAs: a PDA and any device with an IrDA port or adapter. Most universal PDA keyboards use infrared technology because many older PDAs have it, and infrared technology is low-cost and has the advantage of being permitted aboard aircraft.

Synchronization

An important function of PDAs is synchronizing data with a PC. This allows up-to-date contact information stored on software such as Microsoft Outlook or ACT! to update the database on the PDA. The data synchronization ensures that the PDA has an accurate list of contacts, appointments and e-mail, allowing users to access the same information on the PDA as the host computer.

The synchronizing also prevents the loss of information stored on the device in case it is lost, stolen, or destroyed. Another advantage is that data input is usually a lot quicker on a PC, since text input via a touch screen is still not quite optimal. Transferring data to a PDA via the computer is therefore a lot quicker than having to manually input all data on the handheld device.

Most PDAs come with the ability to synchronize to a PC. This is done through synchronization software provided with the handheld, such as HotSync Manager, which comes with Palm OS handhelds, Microsoft ActiveSync for Windows XP and older operating systems, or Windows Mobile Device Center for Windows Vista, both of which sync with Microsoft Windows Mobile or Pocket PC devices.

These programs allow the PDA to be synchronized with a Personal information manager. This personal information manager may be an outside program or a proprietary program. For example, the BlackBerry PDA comes with the Desktop Manager program which can synchronize to both Microsoft Outlook and ACT!. Other PDAs come only with their own proprietary software. For example, some early Palm OS PDAs came only with Palm Desktop while later Palms such as the Treo 650 has the built-in ability to sync to Palm Desktop and/or Microsoft Outlook, while Microsoft's ActiveSync and Windows Mobile Device Center only synchronize with Microsoft Outlook or a Microsoft Exchange server.

Third-party synchronization software is also available for many PDAs from companies like Intellisync and CompanionLink. This software synchronizes these handhelds to other personal information managers which are not supported by the PDA manufacturers, such as GoldMine and IBM Lotus Notes.

Uses

PDAs are used to store information that can be accessed at any time and anywhere.

Automobile navigation

Many PDAs are used in car kits and are fitted with differential Global Positioning System (GPS) receivers to provide realtime automobile navigation. PDAs are increasingly being fitted as standard on new cars.

Many systems can also display traffic conditions, dynamic routing and roadside mobile radar guns. Popular software in Europe and in America for this functionality are TomTom, Garmin, iGO etc. showing road conditions and 2D or 3D environments.

Ruggedized PDAs

For many years businesses and government organizations have relied upon rugged PDAs also known as enterprise digital assistants (EDAs) for mobile data applications. Typical applications include supply chain management in warehouses, package delivery, route accounting, medical treatment and record keeping in hospitals, facilities maintenance and management, parking enforcement, access control and security, capital asset maintenance, meter reading by utilities, and "wireless waitress" applications in restaurants and hospitality venues. A common feature of EDAs are the integration of Data Capture devices like Bar Code, RFID and Smart Card Readers.

Medical and scientific uses

In medicine, PDAs have been shown to aid diagnosis and drug selection and some studies have concluded that their use by patients to record symptoms improves the effectiveness of communication with hospitals during follow-up. A range of resources have been developed to cater for the demand from the medical profession which supply drug databases, treatment information and relevant news in formats specific to mobile devices and services such as AvantGo translate medical journals into readable formats and provide updates from journals. WardWatch organizes medical records to remind doctors making ward rounds of information such as the treatment regimens of patients and programs. Finally, Pendragon and Syware provide tools for conducting research with mobile devices, and connecting to a central server allowing the user to enter data into a centralized database using their PDA. Additionally, Microsoft Visual Studio and Sun Java provide programming tools for developing survey instruments on the handheld. These development tools allow for integration with SQL databases that are stored on the handheld and can be synchronized with a desktop/server based database.

Recently the development of Sensor Web technology has led to discussion of using wearable bodily sensors to monitor ongoing conditions like diabetes and epilepsy and alerting medical staff or the patient themselves to the treatment required via communication between the web and PDAs....

Educational uses

As mobile technology becomes more common, it is increasingly being used as a learning tool. Some educational institutions have integrated PDAs into their teaching practices (MLearning).

PDAs and handheld devices are commonly allowed in the classroom for digital note taking. Students can spell-check, modify, and amend their class notes or e-notes. Some educators distribute course material through the use of the internet connectivity or infrared file sharing functions of the PDA. Textbook publishers have begun to release e-books, or electronic textbooks, which can be uploaded directly to a PDA, reducing the number of textbooks students must carry.

Software companies have developed programs to meet the instructional needs of educational institutions such as dictionaries, thesauri, word processing software, encyclopedias and digital planning lessons.

The increase in mobility of PDAs have caused some problems for school boards and educational institutions. School boards are now concerned about students utilizing the internet connectivity to share test answers or to gossip during class time. Many school boards have modernized their computer policies to address these new concerns. Software companies such as Scantron Corp. have now created programs for distributing digital quizzes which disables the infrared function on PDAs, which eliminates the possibility of information sharing between students during the examination. Many colleges, however, encourage the use of PDAs, and some business, nursing, and physician assistant (PA) programs even require them.

Sporting uses

PDAs may also be used by music enthusiasts. They can be used to play a variety of file formats (unlike most MP3 Players) during physical exercise (e.g. running), unlike certain larger devices such as laptops.

PDAs can be used by road rally enthusiasts. PDA software can be used for calculating distance, speed, time, and GPS navigation as well as unassisted navigation.

PDA's may be used to plan decompression dive profiles, use of mixtures upto 100% oxygen with programmes such as V-planner. Nitrox, Trimix, TriOx, HeliOx, OC, SCR, CCR, RB80, KISS and multilevel dives.

PDA for people with disabilities

PDAs offer varying degrees of accessibility for people with differing abilities, based on the particular device and service. People with vision, hearing, mobility, and speech impairments may be able to use PDAs on a limited basis, and this may be enhanced by the addition of accessibility software (e.g. speech recognition for verbal input instead of manual input). Universal design is relevant to PDAs as well as other technology, and a viable solution for many user-access issues, though it has yet to be consistently integrated into the design of popular consumer PDA devices.

PDAs have recently become quite useful in the Traumatic brain injury/Posttraumatic stress disorder population, especially seen in troops returning home from Operation Iraqi Freedom(OIF)/Operation Enduring Freedom(OEF). PDAs address memory issues and help these men and women out with daily life organization and reminders. As of quite recently, the Department of Veterans' Affairs (VA) has begun issuing thousands of PDAs to troops who present the need for them. Occupational therapists have taken on a crucial role within this population helping these veterans return to the normality of life they once had.

Popular consumer PDAs

- Abacus PDA Watch
- Acer N Series
- AlphaSmart
- Amida Simputer
- BlackBerry
- Encore Simputer
- E-TEN
- Fujitsu Siemens Computers Loox
- HP iPAQ
- HTC Corporation (Dopod, Qtek)'s series of Windows Mobile PDA/phones (HTC)
- HTC, especially the HTC P3470 aka Pharos
- I-mate
- Palm, Inc. (Tungsten E2, TX, Treo, Zire Handheld, and Pre)

- PocketMail (email PDA with inbuilt acoustic coupler)
- Psion - obsolete
- Royal
- Sharp Wizard and Sharp Zaurus - obsolete

Discontinued

- Atari Portfolio
- Apple Newton
- Dell Axim
- GMate Yopy
- Earlier Palm Handhelds
- HP Jornada Pocket PC (phased out/merged with iPAQ line in 2002)
- Compaq iPAQ Merged with HP iPAQ in 2000
- LifeDrive
- NEC MobilePro
- Osaris running EPOC OS distributed by Oregon Scientific
- Casio Pocket Viewer
- Roland PMA-5 (Personal Music Assistant)
- Sony CLIE
- Tapwave Zodiac
- Toshiba e310
- Mindspring
- Sony Magic Link with the Magic Cap operating system

Rugged PDAs

- American_industrial_systems (Mil-Spec, IP67)
- Datalogic Mobile
- Hand Held Products (HHP)
- Intermec
- Psion Teklogix
- Symbol Technologies
- Trimble Navigation

See also

- Personal navigation assistant (PNA)

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| <ul style="list-style-type: none"> ■ Automotive navigation system ■ Construction Field Computing ■ Danger Hiptop ■ Desknote ■ G1 ■ Graffiti (Palm OS) ■ Hipster PDA ■ Information | <ul style="list-style-type: none"> appliance ■ Laptop ■ Medical calculator ■ Mobile software ■ MLearning ■ Mobile Web ■ Netbook ■ Personal area network ■ Personal | <ul style="list-style-type: none"> communicator ■ Personal Information Display ■ Personal information management ■ Screen protector ■ Smartphone ■ Sony CLIE | <ul style="list-style-type: none"> ■ Subnotebook ■ Tablet PC ■ Ultra-Mobile PC ■ Wearable computer ■ Sena Cases ■ Timex Datalink ■ Virtual assistance |
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References

1. ^ HWR accuracy:

- See comments in Wired's Apple Newton Just (<http://www.wired.com/news/mac/0,2125,54580,00.html>)
- See comments under "Software" in MacTech's MessagePad 2000 review (<http://www.mactech.com/articles/mactech/Vol.13/13.04/NewtonGetSerious/index.html>) woooooo
- Comments by Pen Computing's editor (http://www.pencomputing.com/editor/editor_34.html)
- See user testing results discussed in part 6 of this A.I. Magazine article on Newton HWR (<ftp://ftp.apple.com/research/neural/larry/ANHR/AIMag/Yacgeretal.AIMag.pdf>)
- MessagePad 2000 review at Small Dog Electronics (http://www.smalldog.com/newsarchive/kibbles_display.php?id=29)
- See comments under "Note-taking" in MessagePad 2000 review at "The History and Macintosh Society" (<http://www.h-net.msu.edu/~mac/mp2000.html>)
- What's Right With The Newton: HWR (<http://perlnet.umephy.maine.edu/bio/wittmann/pooter/newtuse/hwr.html>)

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